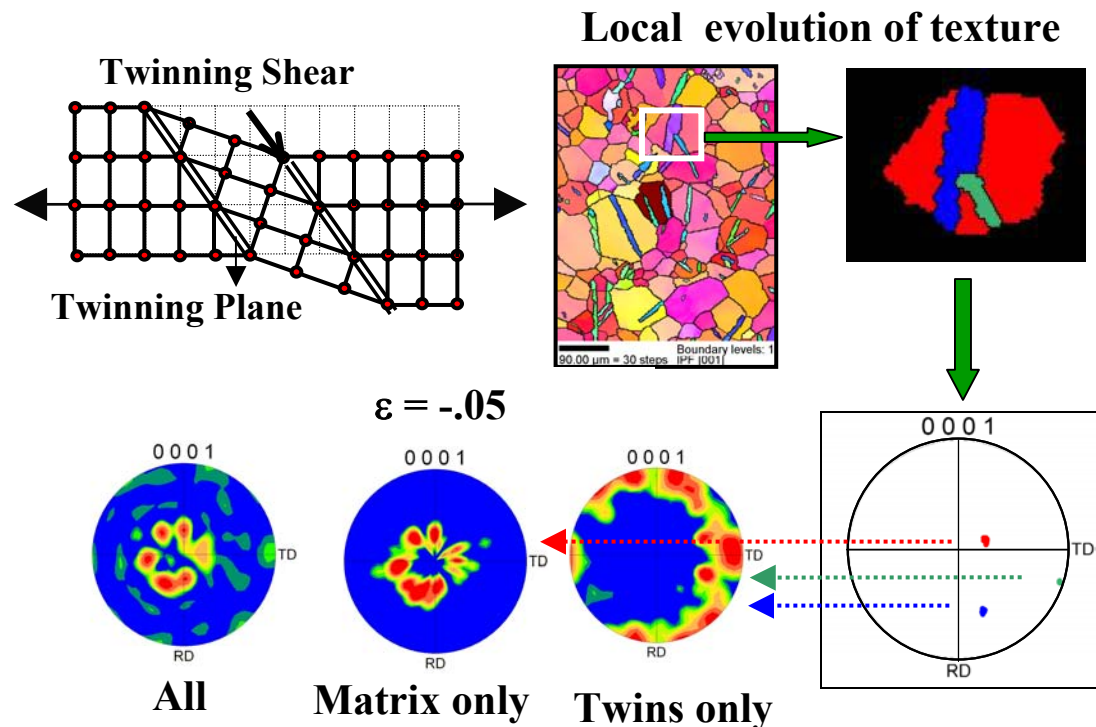


Role of Deformation Twinning in Strain Hardening and Texture Evolution: Experiment and Numerical Simulation

S. R. Kalidindi & R. D. Doherty, Drexel University, DMR-0201382

Deformation twinning is the second most prevalent mode of plastic deformation in metals, and is largely responsible for the impressive combination of strength and toughness exhibited by many commercially important alloys. Here, we conducted a fundamental study into quantifying the precise influence of deformation twinning on subsequent strain hardening and the evolution of underlying microstructure in the material.

It was established that deformation twinning causes: (i) strain hardening of the material due to a reduction of the effective slip length, (ii) strain hardening due to increase in hardness of the twinned regions, and (iii) textural softening due to lattice reorientation of the twinned regions. These relationships were quantified.



Role of Deformation Twinning in Strain Hardening and Texture Evolution: Experiment and Numerical Simulation

S. R. Kalidindi & R. D. Doherty, Drexel University, DMR-0201382

Outreach:

Mr. Mosesson, a high school physics teacher from Moorestown, NJ, spent five weeks in summer 2003 working with our research group. Exposure to cutting-edge research provided an unique experience and excitement, which is expected to have a favorable impact on his students in the high school. We have planned several follow up activities including our visits to his class and visits from his high school students to our laboratory. It is anticipated that this will motivate some of his students to pursue a career in science and engineering. One high school student, Mr. Kamran Arshad spent four weeks in our laboratory in summer of 2003.

Education:

➤ **Ayman Salem** completed his PhD and is presently a visiting scientist at the Air Force Research Laboratory, Dayton, OH. Ayman's work on this project has been awarded the first place in the 2001 TMS Outstanding Student Paper Contest, Graduate Division. **Xianping Wu** and **Harold Sant** are currently pursuing their PhDs on this project.

➤ **Melanie Patel**, an undergraduate student, has been working with our research group for more than an year. Because of early exposure to research, she is now motivated to pursue a BS/MS degree at Drexel University, while working on this project and expanding into novel material systems, including certain biological materials.